

About the RAP

This RAP Handbook is part of a series of publications that the RAP is preparing and distributing to help local citizens understand the importance of watershed stewardship, and support the restoration and preservation of the Cuyahoga River and its tributaries.

The RAP was created in 1988 by Ohio EPA as a community based program aimed at restoring the Cuyahoga River. Our mission is to plan and promote the restoration of the environmental quality of the Cuyahoga River through the remediation of existing conditions and prevention of further pollution and other degradation. The RAP's 39 stakeholder partners include businesses, community groups, government agencies and citizens with an interest in the River.

The RAP offers:

- Organizational, Educational and Technical Services
- Planning and Support for Implementation of Stream Remediation and Restoration Projects
- Special Programs for Local Officials
- Tributary-based Maps and Watershed Information for Local Communities
- Support for local Public Outreach and Involvement Programs

The RAP is a proven resource for bringing together technical knowledge, stakeholders and local officials in a supportive setting to develop and implement effective solutions for restoring our local streams.

The Cuyahoga River Community Planning Organization receives financial support for the RAP from the Cleveland Foundation, The GAR Foundation, The George Gund Foundation, Ohio EPA, federal and state grants, corporate sponsorship, community participation, memberships and donations.

Our resources are focused on assisting citizens and localities to work together in addressing ways to restore and preserve our waterways.



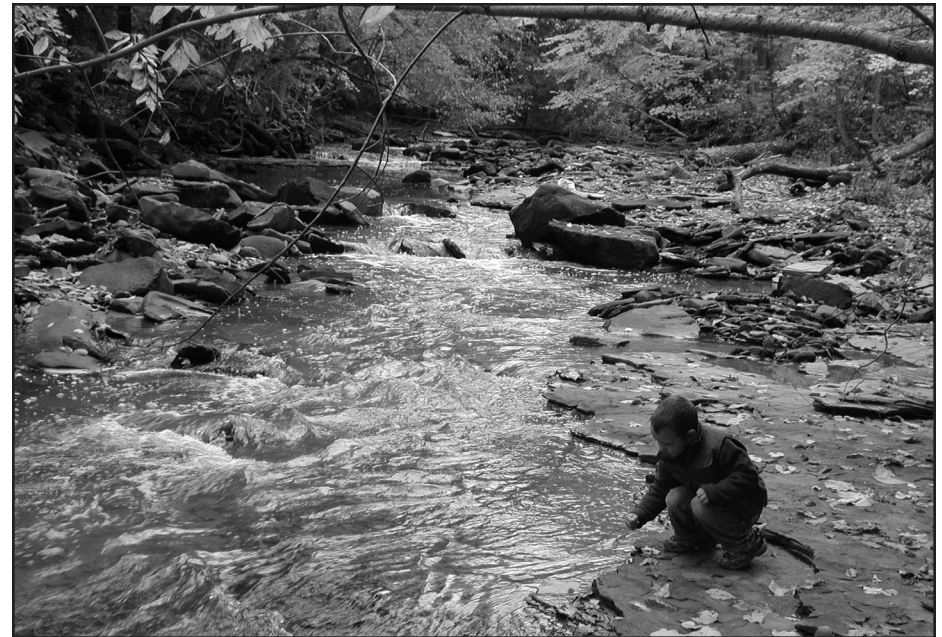
For more information about ways to support stream and watershed remediation in your community, call the Cuyahoga River Remedial Action Plan or RAP at (216) 241-2414 ext. 307



Erie STREAMS AND RIVERS

OPERATIONS AND MAINTENANCE

For Cuyahoga River Streams



Save For Reference

Getting Started

Valued consumer,

Thank you for choosing a Lake Erie creek. You have chosen to live in a watershed that supports a complex ecosystem and provides drinking water for you and your family. Please take a few minutes to familiarize yourself with the proper operation and care of your stream. With proper care and regular service your stream can deliver thousands of years of reliable, high quality service.

How It Works

Your stream is part of a watershed system. Watersheds are Mother Nature's way of managing precipitation.

This **system** is comprised of three parts:

- (1) smaller and larger streams linked together like branches of a tree,
- (2) the landscape which drains the water into the stream and ground, and
- (3) groundwater which supports the stream's flow during dry weather.

As rain reaches the land, it soaks into the ground. Precipitation that does not soak in moves only a short distance before it gathers into rivulets and flows according to the slopes of the land. These hills and valleys are the natural physical boundaries, which help separate and identify drainage basins. Streams receive the excess precipitation off the land and transport it into a larger system of channels. Small streams merge together to form bigger streams, the bigger streams join to form rivers, and eventually the water is delivered into Lake Erie. Water that is drained off your property and into the receiving streams and rivers ultimately flow into Lake Erie, the source of drinking water for millions of people.

From time to time, the stream will receive so much water that it exceeds its carrying capacity, causing an out-of-bank event (commonly called a flood). This is normal. In response to these events, the stream has developed a series of flood plains that absorb and store the excess water. You may notice portions along the flood plain that store water for long periods of time and are very active with plant and animal life. These are called **wetlands**.

IMPORTANT!

Because wetlands have the ability to support a wide variety of life, cleanse and store excess volumes of water, wetlands are a very important feature of your stream and deserve extra care and attention.

Troubleshooting

Your stream is designed to provide centuries of reliable service, however, certain human activities are known to cause damage. If problems develop, you and your neighbors should be able to help repair the stream. Follow the troubleshooting chart below to review how to handle your problem.

Symptom	Possible Cause	Corrective Action
Strange smells.	Under treated sewage discharge into creek.	Support modernizing sewage plants to eliminate Combined Sewer Overflows and discharges from failing septic tanks.
Slimy rocks and/or green surface scum.	Excess nutrients causing too much algae growth.	Reduce lawn fertilization
Expanding bank erosion or channelization.	Excess flow due to urbanization.	Reduce sprawl, add development standards that retain green space and reduces run-off.
Lower dry weather flow.	Too much land surface with uncontrolled run-off.	Increase green space to help infiltration.
Increased flooding.	Too much paved or built land with uncontrolled run-off.	Add more places for infiltration, restore wetlands, prohibit development in flood plains.
Suspended mud in water. Excess sediment on stream bottom.	Erosion from unprotected exposed bare soil, usually during construction.	Report sites to local officials. Support strong ordinances and strict enforcement.
No series of riffles, runs or pool habitats.	Missing Riparian Buffer; too much stormwater.	Restore Riparian Buffer; increase infiltration.
Reduced functionality of your stream.	No local Watershed Council to educate your community and protect the stream.	Call the Cuyahoga River Remedial Action Plan to request assistance.

If the remedies in this chart do not solve the problem, call the Cuyahoga River RAP at (216) 241-2414 Ext. 307

Do Not add excessive pavement and other impervious surfaces to your property and community-

Excess imperviousness will limit infiltration. Roofs, drives, and parking lots all add impervious surfaces that increase run-off and reduce infiltration.

WARNING! Exceeding 25% impervious land cover in your watershed automatically voids any warranty.

Do Not over fertilize your lawn and garden-

Excess nutrients, which is not absorbed, will be flushed off your property into the stream. Too much nutrients in the water will cause algae explosions that suffocate other species.

Do Not plant non-native plants and shrubs near streams-

Non-native plants and shrubs can squeeze out local plants and eliminate habitat for local birds and animals.

DANGER! Do Not operate electrical appliances while standing in the Stream. This can be extremely hazardous!

Service & Repair

For assistance in protecting and restoring your stream in the Lower Cuyahoga River Watershed call the:

Cuyahoga River Remedial Action Plan (RAP)

(216) 241-2414 Ext. 307

For more information, visit our web site @ www.CuyahogaRiverRAP.org

Warranty

Your presence in this watershed means that you have agreed to take personal responsibility for the care and maintenance of this creek. Your creek has been carefully designed and engineered to perform faithfully and will respond exactly to the conditions you create. Adding excess levels of impervious surfaces, adding excess pollutants, and failing to protect the stream bank and corridor, flood zone and related wetlands will drastically reduce the designed functionality of your stream, guaranteed.

For questions about this warranty, call (216) 241-2414 Ext. 307

Basic Features

The stream supports a series of features that help sustain life for the local environmental community. Please take a moment to familiarize yourself with these important features. If you need service or repair, knowing these terms will help:

Riparian Buffer- a strip of vegetated land on either side of the stream which should be protected. Riparian buffers provide shade, bank stabilization, habitat, aid in sediment deposition, and filter out run-off pollutants.

Flood Plain- relatively flat area along the banks prone to receiving the water that flows out of the channel from storms and snowmelt. These should be kept clear of land development.

Wetland- areas identified by frequent flooding, saturated soils, and unique, water-dependent plants. These areas provide important habitat for plants & animals, water filtering, stream bank protection, and ground water recharge.

Meander- the winding of a stream channel in continuous loops of "S" like shapes. Meanders are very common in the Cuyahoga river and its tributaries and provide a way for the stream to extend the length of its channel and banks and also provides increased access to the adjacent flood zone. Meanders should be left in their natural state to allow them to help control water volumes.

Pool- deep, slow moving section of water, in a stream, that provide habitat for fish.

Runs- deep, fast-flowing areas in a stream that provides habitat.

Riffles- shallow sections in the stream channel where oxygen is added by water tumbling over rocks and sand bars. An important habitat for fish eggs and aquatic insects.

Erosion- a natural process of soil removal by wind or rapidly flowing water. Accelerated levels of erosion generally occur on exposed soils at construction sites, bare agricultural lands, and under-vegetated stream banks. Erosion results in a loss of soil and changes the stream channel shape.

Woody Debris- dead tree material that slows streamflow, prevents erosion, and increases biological diversity by providing habitat and food.

Basic Features Cont.

Sedimentation- the natural process of depositing soil from suspension in water. Sediment is deposited on stream channels, or flood zones, as the flowing water slows down. High loads of sediment from urban and agricultural runoff can fill in stream channels, which increase the risk of future floods. Sediment also suffocates species in the water and on the stream bottom.

Organic Pollution- the carbon rich residue that is deposited in streams from decomposing plants, grass clippings, and pet and human waste.

Dissolved Oxygen (DO)- the amount of free oxygen dissolved in water. DO is needed for survival by organisms that breathe, from fish to micro-organisms.

Biochemical Oxygen Demand (BOD)- the amount of dissolved oxygen that is needed by oxygen using micro-organisms. BOD is a measurement that is used to determine the amount of organic pollution in a stream. When organic pollution increases in a stream the (BOD) demand for oxygen increases as micro-organisms use oxygen to break down the pollution. This leads to the depletion of large amounts of free oxygen and the suffocation of fish and other aquatic species.

Safety

Watersheds funnel runoff and concentrate all the chemicals, nutrients, dust, litter, and debris that are washed off the landscape into the stream. Follow these rules to keep your stream clean and assure long service.

Maintenance

Protect Streamside Vegetation-

Do not remove streamside vegetation, it helps filter the water, adds needed shade, stabilizes the bank and provides habitat for local animals.

Protect the Wetlands-

Wetlands collect storm water, which reduces flooding and helps improve water quality by filtering out pollutants carried by run-off. They increase ground water availability, which helps preserve the stream's dry weather flow. Wetlands provide habitat for a variety of local plant and animal species.

Develop Ways To Increase Infiltration On Your Own Property-

Allow gutters and driveway runoff to soak in.

Maintenance Cont.

Maintain Your Septic Tank (if you have one)-

Maintain your septic tank so it does not discharge under-treated sewage into the stream or groundwater.

Adopt & Enforce Stream Protection Ordinances-

Encourage your local government to adopt and enforce stream protection ordinances. Preservation of your stream's banks and vegetated edges is vital to maintain its overall functionality

Support Efforts To Repair Damaged Stream Sections-

Eroded banks, channeled sections, can be repaired and will help restore the stream's function.

Develop New Storm Water Detention Basins As New Wetlands-

To ensure long stream life, precipitation must be enabled to soak in, rather than run-off in large volumes. Providing new places where run-off can be detained to soak in and also function as a mini-wetland will greatly improve the water quality and flow in your stream.

Operate A Compost Bin For Re-cycling Yard Waste-

Excess organic debris can overwhelm the stream. Composting replicates nature's process for reducing organic debris and returning nutrient into the ground.

Organize & Support A Watershed Stewardship Organization-

Volunteer to help organize and support a Watershed Stewardship Organization for your Stream. A local group can help educate, increase awareness and support remediation efforts.

PRECAUTIONS

Do Not encroach and remove vegetation on stream banks-

Building along or mowing your lawn up to the stream's edge removes critical vegetation. Streams need stable, shaded edges to function properly. Streamside shrubs and trees help filter out pollutants, stabilize the bank and provide important habitat.

Do Not dump oil or other wastes into storm drains-

Pollutants that are dumped down storm drains empty into streams untreated. These pollutants accumulate on the stream bottom, affecting bottom feeding fish and insects. Streams are not designed as disposal sites.